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AUTHOR Horowitz, Stephen M.; And Others
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ABSTRACT

The effect of an on-site health promotion program on lifestyle behavior, health, attitude, and stress was studied with 41 university faculty and nonacademic administrators. The participants were administered a maximal graded exercise tolerance test, hydrostatic weighing, and the Lifestyle Analysis Questionnaire. While 32 staff were assigned to an intervention group (I) that attended a wellness program 3 times per week for 12 weeks, 9 staff constituted the control group (C) and followed their regular exercise schedule. The wellness intervention consisted of an aerobic exercise class, lifestyle educational literature, and progressive muscle relaxation. After the 12 weeks, the I and C groups completed a retrospective Lifestyle Activity Patterns Questionnaire in addition to the pretests. While no changes were observed for the C group, lifestyle behaviors improved for the I group, including significant differences for body cathexis, symptoms, and job satisfaction. Between-group differences were observed for tolerance to overload, self-esteem, and symptoms. The positive moderator and strain changes that occurred as a result of the intervention have effects on employee quality of life, and costs related to premature morbidity and mortality. (Author/SW)

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Stephen M. Horowitz, Ph.D.
Assistant Professor
The University of Texas at Austin
Department of Physical and Health Education
222 Bellmont Hall
Austin, TX 78712
512/471-4405

Robert T. Blackburn, Ph.D.
Professor, Center for the Study of Higher Education

Dee W. Edington, Ph.D.
Professor and Chair, Division of Physical Education
Research Scientist, School of Public Health

University of Michigan
Ann Arbor, MI 48109

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WELLNESS INTERVENTION EFFECTS ON LIFESTYLE, ATTITUDES AND STRESS

Abstract

This study examined the extent to which an on-site health promotion program influenced lifestyle behavior, health, attitude, and stress in 41 university faculty and non-academic administrators. Subjects were administered a maximal graded exercise tolerance test, hydrostatic weighing and the Lifestyle Analysis Questionnaire.

Subjects assigned into the intervention (I) group (N=32) participated in a wellness program three times per week for 12 weeks. Control (C) (N=9) subjects followed their regular schedule of exercise during the treatment period. Following the study, all subjects completed a retrospective Lifestyle Activity Patterns Questionnaire in addition to the described pre-tests. Lifestyle behaviors improved only for the I group. Significant post-test differences for body cathexis, job satisfaction and symptoms occurred. Between-group differences were observed for tolerance to overload, self-esteem and symptoms. No changes were observed for the C group. The positive moderator and strain changes occurring as a result of the intervention have impact on employee quality of life, and costs related to premature morbidity and mortality.

Introduction

A number of studies have been done on the relationship between health and stress in general, but only a few have looked at the effects of stress on university faculty and administrators (3). Recent budgetary cutbacks, increased teaching and administrative loads, and lack of job opportunities elsewhere all contribute to increased job stress and employee health problems in University settings.

With the rising costs of health care, colleges and universities can ill afford to ignore the fact that while stress is often unavoidable, there are a variety of physical and cognitive interventions that can be utilized to modify the negative effects on health and attitude that are produced by excessive stress. Increasing resistance to daily work stress, along with developing effective coping methods, can result in happier, healthier, and more productive employees.

University faculty and administrators already possess a high level of education in their particular areas of expertise. However, knowledge of positive health habits and its practical implementation within one's own lifestyle is very often not a part of this group's educational interests. Consequently, incorporating educational literature and group counseling in combination with an exercise and relaxation program could be an effective means for improving stress management and coronary heart disease risk profiles.

Based on these premises, the purpose of the research was to determine the consequences of a short-term wellness program on

lifestyle behavior, health, perceived stress and strains, and moderators of job stress that influence health and attitude in a selected sample of university faculty and administrators.

Data Sources and Methods

The Person-Environment Fit Model (Figure 1) guided the selection and analyses of the variables used in the study (9,11,12) and layed the groundwork for the wellness intervention strategy. In this model, stress is a dynamic, changing mismatch between an individual's abilities, motivations and values and the extent to which they match existing opportunities. The greater the discrepancy between these objective and subjective components regarding the environment and/or the individual, the greater is the perceived stress. Prolonged stress is believed to eventually produce negative physiological, attitude and behavioral effects or "strains." The model described here suggests that a wellness intervention program could reduce health and attitude strains through enhanced feelings of self-esteem and improved tolerance to stress overload which would "buffer" the effects of job stress.

(Insert Figure 1 about here.)

The stress, moderator and strain variables used in the study are displayed in Figure 2. Strains in this study are viewed as being the dependent variables, whereas the LAQ job stress measure is presented as the dependent variable.

(Insert Figure 2 about here.)

Subjects were 26 non-academic, high-level administrators and 15 faculty from the natural sciences and humanities at the University of Michigan. They completed the Lifestyle Analysis Questionnaire (LAQ), a maximal exercise treadmill test and hydrostatic weighing. A group feedback session followed these tests for the purpose of interpreting results and providing materials for changing behavior and developing healthier lifestyles.

Thirty-two subjects were assigned into an intervention group, while 9 subjects acted as the control. Assignment into the experimental group was based solely upon the subject's ability to attend the intervention program at the scheduled time. While not a random distribution, comparisons between these groups revealed non-statistical differences.

Subjects in the control group were asked to continue with their regular, daily routines and were then left to their own resources for the duration of the study. The wellness intervention consisted of an exercise class scheduled for 45 minutes, three times per week for 12 weeks, lifestyle educational literature, and progressive muscle relaxation (19,20). Each exercise class consisted of a 5-minute warm-up, 25-minute aerobic conditioning, and 5-minute cooldown session. The aerobic conditioning segment was comprised of walk/jogging, and a variety of gross motor movements such as hopping, skipping, weaving, and so forth. Heart rates were manually monitored by palpation approximately every five to ten minutes to insure proper exercise intensity (70% - 85% max VO_2).

The educational materials included topics on changing behavior and facts about promoting healthier lifestyles. These handouts included the same information subjects received during the initial group counseling, and so provided additional reinforcement of proper lifestyle behavior.

A portion of several class sessions was set aside for participants to practice the progressive relaxation exercises. To facilitate learning of proper techniques, subjects were given a cassette tape of the relaxation text so they could also practice at home.

Upon termination of the exercise intervention, subjects in both the exercise and control groups completed a Retrospective Lifestyle Activity Patterns Questionnaire in addition to all the previously described tests and self-report instruments.

Results and Discussion

Self-reported lifestyle activities during the 12-week period were assessed. Results for the intervention and control groups are shown in Table 1. Except for smoking, the wellness intervention resulted in differences between groups for all lifestyle behaviors. The greatest influence of the intervention was reflected by an increased practice of general health habits.

(Insert Table 1 about here.)

These lifestyle behavior changes reported by this group are most encouraging. Educating individuals in proper lifestyle has previously been shown to produce significant changes in nutrition and weight control, cholesterol intake and blood pressure (1,22,30). It is presently believed that increasing one's

pressure (SBP) and resting heart rate (RHR). Changes in SBP and RHR are often most affected when the initial fitness levels of the subjects are low and the systolic BP and RHRs are high. The mean pre-intervention max VO_2 value for the intervention group was 40.0 ml/kg-1. Based on a mean age of 49, this value represents a relatively good level of fitness. The initial high level of fitness may partly explain the nonsignificant changes in blood pressure and heart rate.

The lack of significant changes in max VO_2 is contrary to most studies reported in the literature. Even a study done for as short as six weeks (24) resulted in significant increases in max VO_2. This non-significant finding for the intervention group may have been limited, in part or combination, by the relatively high level of initial fitness, the minimal time allotted for the aerobic conditioning segment, and/or the short duration of the study.

However, significant improvements for the intervention group were found for body cathexis (physical self-esteem), job satisfaction and psycho-physiological symptoms. Scores for self-esteem improved substantially, but were only significant at $p=.07$.

Analyses of covariance revealed statistical differences between groups for tolerance for overload (personal preference), self-esteem and psycho-physiological symptoms. Referring to Table 2, higher scores for these measures indicate increased benefit. By way of illustration, the measures of job satisfaction and symptoms increased from 64.2 to 67.1 and 92.9 to 95.6, respectively. Since a score of 100 equals high job satisfaction or no symptoms, these are positive trends.

Tolerance to Overload is an indication of how much incoming information, work, personal interactions, change, and deadlines an individual would preferentially choose. The higher the score, the greater the tolerance. These results suggest that, in comparison to the control group, subjects in the wellness program are better able to tolerate environmental work stress.

The variable, psycho-physiological symptoms, is a self-reported measure of the frequency of various aliments, e.g., headache, irritability, insomnia, etc., experienced during the past year. Although reported symptoms improved, measures of job stress remained the same. These findings support our original hypothesis in that there was an increase in the moderating variables leading to a buffering effect on job stress. This improved tolerance to overload provided subjects with a greater ability to cope with stress which was translated into less symptoms.

Both the exercise and the muscle relaxation techniques may have contributed to these reductions in stress-related symptoms. Schwartz (28) suggests that exercise may be beneficial for those who experience anxiety at the somatic level, while meditation or muscle relaxation may be better strategies for those who are overburdened by cognitive anxiety. Jacobson (19,20) proposed that muscle tension is influenced by emotional state. He found that consciously relaxing striated muscles diminished symptoms associated with anxiety by a reduction in sympathetic hypothalamic activity.

Psychological benefits of exercise are continually being reported in the literature. Much of the research on exercise and its effects on tension, anxiety, and depression support the

conclusion that aerobic exercise contributes to an improved sense of well-being, self-esteem and body cathexis (21,26). The positive changes in self-esteem reported in this study support these data. Changes in the body as a result of fitness training might reasonably be expected to alter one's body image which, in turn, is highly related with, and might be expected to radiate to self-esteem. Heaps (14) suggests that these positive alterations in mood and self-esteem may be more associated with the perception of improved fitness rather than with actual changes in physical fitness. Consequently, an individual's perceptions about personal fitness training effects may be as important as, or even more important than, the physical changes themselves when looking at alterations in self-esteem.

There are a number of theories which could explain the tranquillizing effects of exercise. Reductions in circulating levels of catecholamines (13), hypothalamic heating via exercise-induced thermogenesis (6), reduced muscular tension (29), and alteration of cortical proprioceptive stimuli (23) may singularly, or in combination, also contribute to the reported improved psychological status.

Summary

Stress-related strains develop when there is poor congruence or fit between the subjective and objective person and environment. The paradigm described in Figure 1 (31) posits that people perceive stress in response to certain objective conditions. These conditions are usually perceived as being stressful by people when the demands made on them exceed their abilities, or when strong needs or values remain unfulfilled. French, Rodger and Cobb (9)

suggest that conditioning variables, both personal and situational, moderate the effects of stress on strain. These stress moderators help to buffer persons against stress primarily by facilitating efforts at coping and defense. The increased well-being and reduced anxiety brought about by exercise and relaxation could increase coping efforts allowing individuals to perceive their jobs as being less threatening or stressful. Thus, increasing the level of one's self-esteem, for example, could increase the perception of his/her ability to fulfill specific demands made on him/her and reduce the misfit and strain/outcome. This could lead to manifesting less psychological, physiological and behavioral responses productive of disease.

The increase in lifestyle and stress-related diseases impacts both employee quality of life and premature morbidity and mortality. The findings presented here should be encouraging to health promotion professionals in that a short-term wellness program incorporating aerobic exercise, progressive muscle relaxation, and lifestyle education had beneficial effects on lifestyle behavior and stress-strain relationships. Future studies are needed to determine the effects of health promotion programs over the long term, as well as research to determine the differential stressors and effects on health and attitude for other occupational groups, such as women and blue collar workers, so that appropriate interventions can be effectively implemented.

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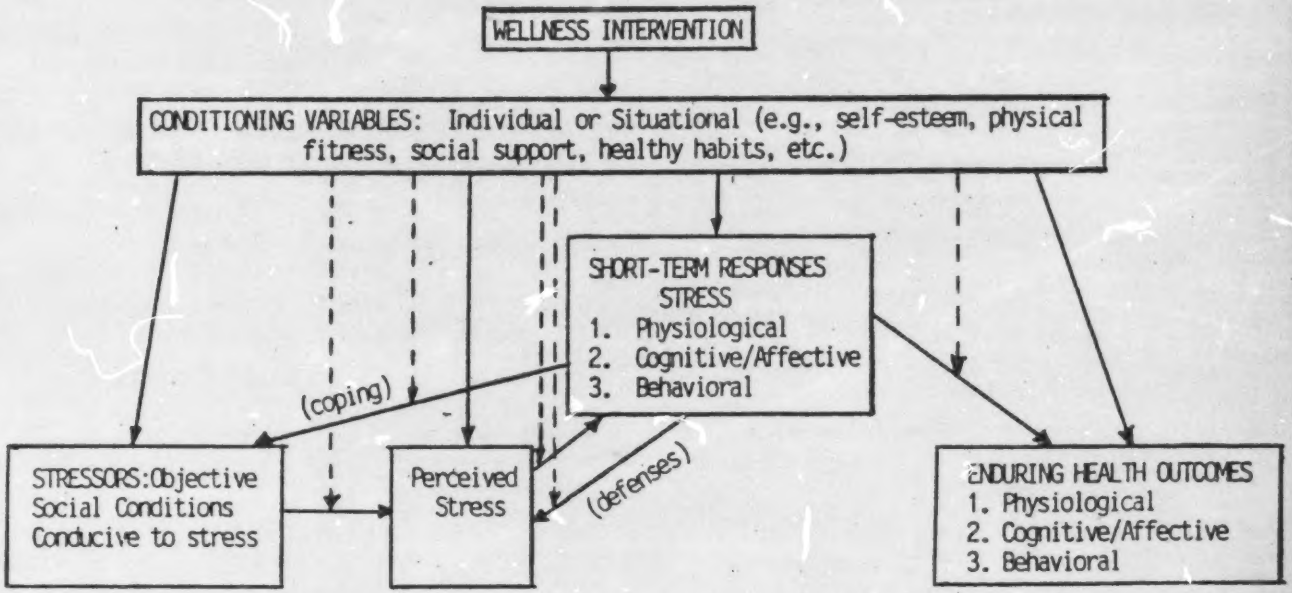

NOTE: Solid arrows between boxes indicate presumed causal relationships among variables. Dotted arrows from the box labeled "conditioning variables" intersect solid arrows, indicating an interaction between the conditioning variables in the box at the beginning of the solid arrow in predicting variables in the box at the head of the solid arrow.

Figure 1. A Paradigm of Stress Research (Adapted from House, 1974)

Figure 2. The Variables

STRESSES	MODERATORS	STRAINS
OVERALL JOB STRESS (LAQ)	A. Personal 1. Personal Preference 2. Self Responsibility for Health 3. Self Responsibility for Coronary Heart Disease 4. Self-esteem 5. Body Cathexis (physical self-esteem) B. Fitness 1. Health Habits 2. Percent Body Fat 3. Max VO_2 4. Resting Heart Rate	A. Life Satisfaction B. Overall Job Satisfaction C. Health 1. Symptoms 2. Systolic Blood Pressure 3. Diastolic Blood Pressure

Table 1

Self-Reported Lifestyle Behavior Changes
For the Interventions and Control Groups
During a 12-week Period

Lifestyle Behavior	Intervention Group (N=32) Yes, From WI[a] (%)	Yes, Not From WI (%)	No Change (%)	Control Group (N=9) Yes, From Retesting (%)	No Change (%)
Stop smoking	0	0	100	0	100
Attained ideal weight	34.4	9.4	56.2	11.1	88.9
Lost weight	43.8	0	56.2	11.1	88.9
Average weight loss (lbs.)	9.2	--	90.8	8.1	91.9
Began or continued to exercise outside class	37.5	9.4	53.1	11.1	88.9
Practiced stress management	40.6	0	59.4	11.1	88.9
Reduced alcohol intake	37.5	3.1	59.4	0	100
Improved general health habits	75.0	0	25.0	0	100
Decreased cholesterol intake	40.6	18.8	40.6	11.1	88.9

[a]WI = Wellness Intervention

Table 2
Stress, Moderator and Strain Changes Over a 12-Week Period

Variable	Intervention Group (N-32) Pre Mean ± SE	Intervention Group (N-32) Post Mean ± SE	Control Group (N-9) Pre Mean ± SE	Control Group (N-9) Post Mean ± SE
STRESS				
Job stress	76.7 ± 2.2	77.8 ± 1.4	77.2 ± 3.6	75.4 ± 3.6
MODERATORS				
Personal Preference	55.4 ± 1.9	58.7 ± 1.7[a]	54.2 ± 4.0	45.0 ± 3.6
Self-esteem	86.0 ± 2.8	91.3 ± 2.3[b]	85.0 ± 4.7	81.6 ± 4.7
Body cathexis	63.0 ± 2.1	69.0 ± 2.6[d]	70.2 ± 4.3	70.4 ± 4.9
Healthy Habits	64.5 ± 3.4	68.3 ± 2.3	69.0 ± 5.3	61.9 ± 5.6
Lifestyle knowledge	77.2 ± 1.9	79.2 ± 2.6	77.5 ± 3.6	83.3 ± 3.7
Self-responsibility for health	70.1 ± 2.2	74.3 ± 1.4	72.6 ± 6.0	71.1 ± 3.4
Self-responsibility for coronary heart disease	97.4 ± 1.8	98.3 ± 1.0	93.3 ± 5.8	94.3 ± 3.3
Percent body fat	20.7 ± 1.3	19.6 ± 1.0	22.1 ± 1.6	21.1 ± 2.5
Resting heart rate	73.8 ± 2.5	70.9 ± 3.5	76.7 ± 2.3	80.3 ± 5.9
Max VO_2	40.0 ± 1.5	41.1 ± 1.3	38.4 ± 2.7	42.3 ± 3.4
STRAINS				
Job satisfaction	64.2 ± 1.9	67.1 ± 1.8[c]	67.8 ± 2.5	67.2 ± 2.5
Life satisfaction	82.3 ± 2.5	85.0 ± 2.4	78.2 ± 6.4	75.3 ± 4.6
Systolic blood pressure	124.9 ± 2.3	120.5 ± 2.6	127.4 ± 4.1	122.1 ± 3.4
Diastolic blood pressure	80.1 ± 1.4	80.5 ± 1.4	81.8 ± 2.7	81.4 ± 2.7
Symptoms	92.9 ± 1.4	95.6 ± 1.3[b,c]	92.3 ± 3.1	89.7 ± 2.4

[a] Between groups $p < .05$
[b] Between groups $p < .01$
[c] $p < .05$
[d] $p < .01$

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